

INTEGRATED AUTONOMOUS QUADCOPTER FOR AIR DELIVERY SYSTEM

**This thesis is presented in partial fulfillment for the award of the
Bachelor of Engineering (Hons) Electronics (Communication)
UNIVERSITI TEKNOLOGI MARA**



NORHAMIZWAN BIN HAMIR

**B.ENG (HONS) ELECTRONIC
(COMMUNICATION)**

**Faculty of Electrical Engineering
UNIVERSITI TEKNOLOGI MARA
40450 SHAH ALAM, SELANGOR**

JULY 2014

ACKNOWLEDGEMENT

Alhamdulillah, in the name of Allah S.W.T. the most merciful, I would like to especially thanks to Him in the first place because of His help and permission for giving me adequate time and health, also the opportunity to complete this project entitled “Integrated Autonomous Quadcopter for Air Delivery System” which meets the objectives before the deadline.

I would like to express my gratitude to all those who have kept supporting and contributing their ideas and taught especially to my supervisor Madam Norbaiti Bt Sidik for her guidance and advice in monitoring me to complete this project. A very special thanks to my parents who fully keep supporting and understand my conditions and situations at any circumstances. Besides, my appreciation goes to my classmates and some other friends who are involved directly or indirectly to accomplish this project successfully. The full support, attention, time and advices gives a very full appreciation to me. Million thanks to all,

ABSTRACT

Package delivery or parcel delivery has become prominent in everyday life. Most of them contain mainly high value mail or parcels as single delivery. The service is provided by most express mail, postal systems, private package delivery services and less than truckload shipping. Normally, a central post office will keep these packages in the storage before a postman or delivery person came to collect them and distribute to houses, offices and some other places every day. However, the tasks seems to be challenging and difficult throughout these days since there are higher number of demands of packages or parcels being delivered from online shopping order system.

Therefore, an integrated autonomous quadcopter for air delivery system would be one of the best idea to be implemented in order to reduce the burden of the postman responsibilities besides producing effective and alternative way of delivering package system in this new era. With no person aboard, this Unmanned Aerial Vehicle (UAV) which commonly known as a drone will operate from its base station to deliver any parcel or package from one place to another automatically by using the waypoint configurations with the aid of Global Positioning System.

Keywords — Quadcopter, autonomous, Unmanned Aerial Vehicle (UAV), Global Positioning System (GPS), air delivery system, way point.

TABLE OF CONTENTS

CHAPTER	LIST	PAGE NO.
	DECLARATION	i
	ACKNOWLEDGEMENT	ii
	ABSTRACT	iii
	TABLE OF CONTENTS	iv
	LIST OF FIGURES	vi
	LIST OF TABLE	ix
	LIST OF SYMBOLS	x
	LIST OF ABBREVIATION	xi
CHAPTER 1	INTRODUCTION	
	1.1 BACKGROUND OF STUDY	1
	1.2 PROBLEM STATEMENTS	4
	1.3 OBJECTIVES	5
	1.4 SCOPE OF WORK	5
	1.5 THESIS OUTLINE	6
CHAPTER 2	LITERATURE REVIEW	
	2.1 INTRODUCTION	7
	2.1.1 Unmanned Aerial Vehicle (UAV)	7
	2.1.2 The quadcopter	8
	2.1.3 Autonomous system configurations	10
	2.1.4 Global System for Mobile Communications (GSM) with Short Message Service (SMS)	11

CHAPTER 3	METHODOLOGY	13
	3.1 INTRODUCTION	13
	3.2 HARDWARE AND SOFTWARE SPECIFICATION	14
	3.2.1 List of hardware	14
	3.2.2 Price list of hardware components	25
	3.2.3 Hardware Tools	26
	3.2.4 Software Tools	31
	3.3 OVERALL WORK PROCESS FLOW	34
	3.4 SYSTEM BLOCK DIAGRAM	35
	3.5 HARDWARE FLOWCHART	38
	3.5.1 Quadcopter hardware flowchart	38
	3.5.2 SMS system hardware flowchart	39
	3.6 SOFTWARE FLOWCHART	41
	3.6.1 Autonomous configurations software flowchart	41
	3.6.2 Arduino Uno program flowchart	44
	3.6.3 ADquadrone application flowchart	
CHAPTER 4	RESULTS AND DISCUSSIONS	45
	4.1 INTRODUCTION	45
	4.2 RESULTS, OBSERVATONS AND DISSCUSSIONS	45
CHAPTER 5	CONCLUSION	55
CHAPTER 6	RECOMMENDATIONS	56
	REFERENCES	58